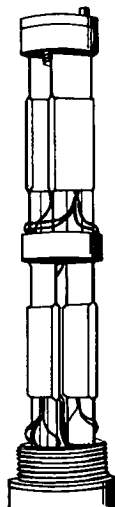


NASA TECH BRIEF

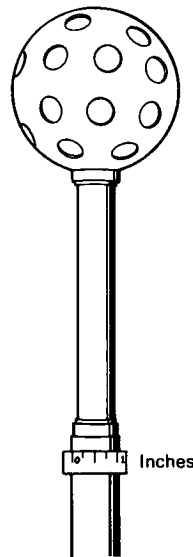


This NASA Tech Brief is issued by the Technology Utilization Division to acquaint industry with the technical content of an innovation derived from the space program.

New Anemometer Has Fast Response, Measures Dynamic Pressure Directly



STRAIN GAGE BALANCE



ASSEMBLY

The problem: The precise measurement of fluctuating, gusty winds having high-frequency components is difficult with instruments that indicate only mean averages of all components.

The solution: A simple anemometer featuring fast response to high-frequency wind fluctuations by direct measurement of two drag-force components in orthogonal planes.

How it's done: A two-component strain-gage balance is contained inside a 1 1/4-inch pipe. Mounted on this balance is a hollow ball 3.7 inches in diameter and having a total of twenty-six 5/8-inch-diameter holes in its surface. An outer screw-on cover tube

serves as a container for viscous fluid used to damp out vibrations at the instrument's fundamental frequency. This hole-ball exhibits a high drag coefficient of 0.8 and its drag-force vector remains essentially constant, both in magnitude and direction, when the azimuth angle of the ball is varied. Deviation between the direction of the mean aerodynamic force on the ball and the free-stream direction is a small, systematic $+3^\circ$ to -3° for each quarter turn of the ball.

Notes:

1. In a balloon mounted application, this device could be used to determine wind profiles to extensive heights.

(continued overleaf)

2. Installed at various heights on a tower, the anemometer would be helpful in the takeoff and landing of light planes.
3. Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
Langley Research Center
Langley Station
Hampton, Virginia, 23365
Reference: B63-10530

Patent status: NASA encourages commercial use of this innovation. No patent action is contemplated.

Source: Wilmer H. Reed III and James W. Lynch
(Langley-28)